

## **A Rush of Excitement, From Filling in Empty Spaces to Completing a Large Loop**

By WILL SHORTZ   March 22, 2007

The elegance of a logic puzzle is determined by the ratio of two things: the simplicity of its rules versus the variety and depth of logic needed to solve it.

By this measure one of the most elegant puzzles around is kakuro. Its rules are so simple they can be explained in two sentences, yet the brainwork needed to solve it is quite complex. Dozens of books on kakuro have been published, and it has been widely promoted as the next big thing after sudoku.

Despite its trendy Japanese name, though, kakuro is neither new nor Japanese. Invented by a Canadian building constructor, James E. Funk, it was first published in the United States in 1950 in *Official Crossword Puzzles* magazine under the name “cross sums.” Gradually, cross sums grew in popularity and became a regular feature in Dell puzzle publications. The publisher Nikoli picked it up in the 1980s, renamed it and spurred its international growth.

Like sudoku, and crosswords before it, kakuro is a game of filling squares. As human beings, we like to fill up empty spaces, so kakuro strikes an elemental chord.

To begin, you commonly start with sums that are either very low or very high for the number of squares. For example, an answer with three squares totaling 7 has to be filled with 1, 2 and 4 in some order. No other combination works. A four-square answer totaling 28 has to be either 4, 7, 8 and 9 or 5, 6, 8 and 9. And if these two answers intersect, the digit at the crossing must be 4, since that is the only digit the possible intersecting answers have in common.

The puzzle appeals to people who like complex number play. Unlike sudoku, though, kakuro requires actual math — specifically, addition. Personally, while I enjoy kakuro, I do not think I could ever become addicted to it because the arithmetic is a little too repetitive and feels too much like schoolwork.

For a purely Japanese puzzle that requires no math, I recommend nurikabe, also called islands in the stream. Nikoli introduced it in 1991, causing a sensation.

Nurikabe has a few more rules than kakuro or sudoku, but it is easily learned. Filling in the first few squares is usually simple, since any squares orthogonally adjacent to a 1 can be immediately shaded. Also, if a square is situated directly between digits, it can be shaded as well, since no islands can touch each other orthogonally. From there, look for the most constrained parts of the grid (often the corners) and proceed. Work back and forth between the shaded squares and the white ones to finish.

Solving a nurikabe builds to a rush of excitement, because the last squares tend to get filled in quickly. This in turn makes you want to do another nurikabe immediately, just as finishing up a sudoku in a hurry makes you want to do another sudoku. Hence the addictiveness of each of these puzzles. I cannot tell you how many times I’ve said, “Just one more, then I’ll quit.”

Nurikabe is particularly suited for electronic or online solving, because it is easier and faster to click squares to change their shading status than to shade them in by hand. But the puzzle works well on paper, too.

Masyu, or pearls, is a logic puzzle that Nikoli introduced relatively recently (in 2000), yet it is already a classic. Several books of just masyu have been published. Unusually, it does not involve numbers or letters, just black and white circles in a grid of squares.

As in all Japanese logic puzzles, the rules of masyu are short and easily learned. The puzzle uses only a small amount of space. (The grid size varies. I prefer small to medium grids to avoid tedium.) And it can be of any level of difficulty, very easy to very hard.

To solve a masyu, start with the circles on the edges of the grid. White pearls have lines passing straight through them. Black pearls have lines turning 90 degrees. A line emanating from a black pearl must go at least one full square before turning. At least one of the two lines emanating from a white pearl must turn immediately. Build from what you know to what you do not know, making sure never to connect two ends of a line until you have completed a single large loop.

There are dozens more logic puzzles where these come from. A 2004 Nikoli handbook shows 215 different types, each with helpful examples for readers whose Japanese is a little rusty. These are followed by two or more puzzles to solve. Some of the most popular types are described on Nikoli's Web site, [www.nikoli.co.jp/en](http://www.nikoli.co.jp/en), with free puzzles to do.

Of Nikoli's puzzles I have tried so far, my current favorite is nurikabe, because it is easy to start, but it still packs plenty of challenge. Next week, I may have a different favorite. There are so many types to choose from. We are living in puzzling's golden age right now.

*Will Shortz is the crossword puzzle editor of The New York Times and the editor of numerous collections of sudoku puzzles for St. Martin's Press.*

### **Your assignment**

*Answer these on a separate page. Work the puzzles on the following page and attach them to your work.*

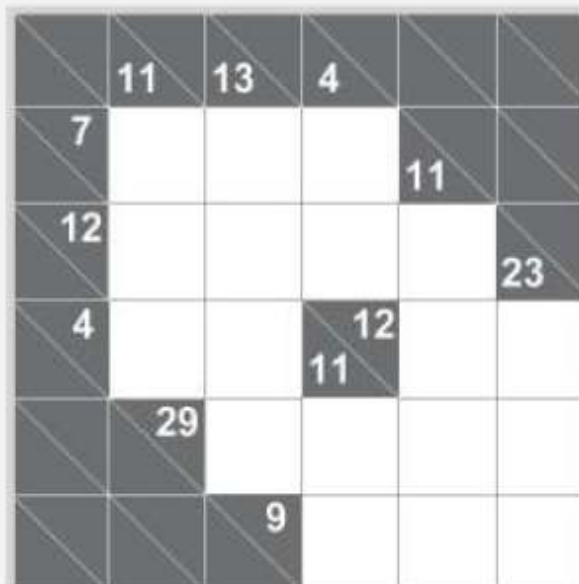
1. How is sudoku played?
2. How does kakuro differ from sudoku?
3. What are the rules of nurikabe?
4. What makes masyu a challenging game?
5. How are all four logic games similar?
6. Which of the games do you think would be most challenging? Why?
7. Which do you think would be the most fun? Why?
8. Why do you think the games might be addictive?

KAKURO MASYU NURIKABE

**HOW TO PLAY** Complete the grid by entering the digits 1-9 in the empty squares. The sum of the digits in each answer across or down equals the given number immediately preceding it. No digit is repeated within an answer. There is only one solution to the puzzle shown here.

**WILL SHORTZ'S SOLVING TIME**

5 minutes 30 seconds



KAKURO MASYU NURIKABE

**HOW TO PLAY** "String" all the black and white "pearls" into a single, continuous loop. The loop must proceed horizontally or vertically (never diagonally) through the squares.

A line going through a white pearl must proceed straight through the pearl, but it must turn 90 degrees in the previous and/or next square in its path.

A line going through a black pearl must turn 90 degrees at the pearl and then continue straight for at least one more square in each direction.

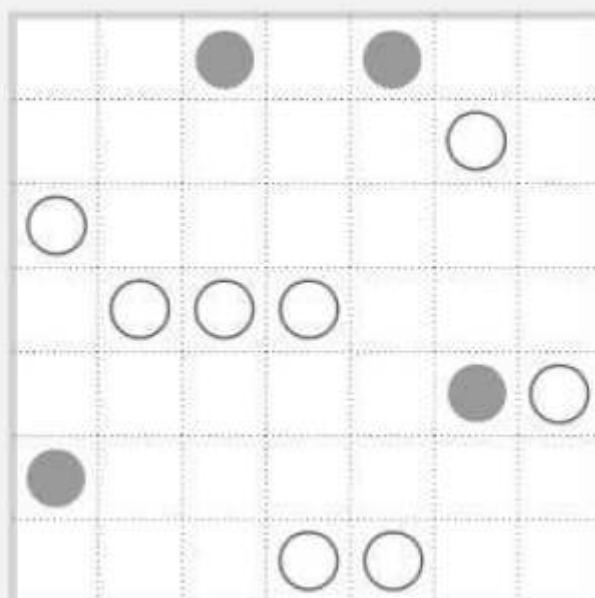
Not all squares need to be used in the string.

There is only one solution to the puzzle shown here.

**WILL SHORTZ'S SOLVING TIME**

9 minutes 15 seconds

A note from Mr. Shortz: "Masyu isn't as hard as this time may suggest. I got tangled up after making a mistake, which took me awhile to undo."



**HOW TO PLAY** The object is to determine which squares in the grid are white ("islands") and which are black ("water").

Each numbered square must belong to an island of white squares connected on their sides. The number indicates the number of white squares connected. Every island has exactly one numbered square. Two islands cannot touch except at their corners.

The black squares in the completed grid must all be contiguous (forming a single chain of squares connected on at least one side). There cannot be any 2-by-2 blocks of black squares.

There is only one solution to the puzzle shown here.

**WILL SHORTZ'S SOLVING TIME**

3 minutes 50 seconds

5		1				
				1		6
2		4				
				2		3